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| 10/584,398 | 07/05/2007 | Masayuki Tsutsumi | 358362011300 | 9225 |

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| EXAMINER |
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FANG, SHANE

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1796

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06/23/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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| Office Action Summary | Application No. 10/584,398 | Applicant(s) TSUTSUMI ET AL. | |
| | Examiner SHANE FANG | Art Unit 1796 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-19 is/are pending in the application.
- 4a) Of the above claim(s) 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-19 is/are rejected.
- 7) ☒ Claim(s) 1,5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/22/2006, 4/13/2007, 6/05/2008.

DETAILED ACTION

None of the X references on ISP are anticipatory. US 5670262 and US 5741585 listed as Y references are used for 102 rejections on some claims.

Election/Restrictions

The applicant elected Group I (claims 1-9, 11, and 13-19) without traverse. This restriction is made FINAL.

Claim Objections

1. Claims 1, 5, and 7 are objected to because of the following informalities: "obtainable" is recommended to be changed to "obtained". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 5 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Dalman (US 5670262) listed on IDS.

As to claim 5, a product-by-process claim, Dalman discloses a polyimide film obtained by reacting pyromellitic dianhydride with 5-amino-2-(p-aminophenyl)benzoxazole (Abs., Ex. 1) and cured to polyimide of 51 μm , falling within the range of thickness of application (1-150 μm [0089]). Dalman is silent on the property of water residue measured by the method recited in claim 5. However, in view

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of the substantially identical composition, it appears that the adduct would have inherently possessed the claimed properties. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise. **In re Best**, 562 F. 2d 1252, 195 USPQ 430 (CCPA 1977). See MPEP § 2112. In this particular case, the polyimide film disclosed by Dalman shows no structural and chemical difference from the polyimide film recited in claim 5. As a result, the disclosed polyimide film would inherently possess the property of water residue.

As to claim 18, Dalman discloses PWB having a layer of polyimide containing benzoxazole moiety (Abs.).

4. Claims 5 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Harris et al. (US 5741585) listed on IDS.

Harris et al. discloses a polyimide film obtained by reacting bisoxazole containing diamine with dianhydride (Ex. 1,3 Com Ex. A) followed by spin coating on silicon wafer and cured to polyimide having a thickness of 2.7-2.9 μm , falling within the range of thickness of application (1-150 μm [0089]).

Claim 5 is rejected again for the same rationale as applied in the above paragraph 3.

As to claim 18, Harris et al. discloses a polyimide film (base substrate) (Ex. 1, 3 Com Ex. A). Harris et al. is silent on "for printed wiring assemblies". However, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use

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results in a structural difference (or, in the case of process claims, manipulative difference) between the claimed invention and the prior art. If so, the recitation serves to limit the claim. **In re Otto**, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP 2111.02. In this particular case, it appears there is no difference between the base substrate in the reference and the one in claims 18, and the polyimide base substrate of Harris is clearly capable of being used for printed wiring assemblies.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 6, 11, 13-14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalman (US 5670262) in view of Asakura et al. (US3966686).

Dalman discloses a polyimide film obtained by reacting pyromellitic dianhydride with 5-amino-2-(p-aminophenyl)benzoxazole (Abs., Ex. 1) and cured to polyimide of 51 μm , falling within the range of thickness of application (1-150 μm [0089]).

Dalman is silent on planar orientation coefficient measured by X-ray diffraction as recited in claim 1.

Asakura et al. discloses films of aromatic polyamid-hydrzide, a polymer which is similar and resembles polyimide (Abs). Said films are stretched to obtain planar orientation coefficient of more than 0.75 (note the similar determination method, 6:1-30,

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5:5-15) that overlaps with the claimed range (0.79-0.89). It has been found that where claimed ranges overlap ranges disclosed by the prior art, a *prima facie* case of obviousness exists - see MPEP 2144.05. Asakura et al. further discloses the motivation of obtaining planar orientation to improve tensile strength, dielectric loss, curling etc. (1:15-20, 2:1-25).

Therefore, as to claim 1, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyimide film having benzoxazole moiety disclosed by Dalman and add step of obtaining planar orientation coefficient in view of Asakura et al. The motivation would have been to improve tensile strength, dielectric loss, curling etc. in the resultant polyimide films, as taught by Asakura. Consequently, one ordinary skill in the art would have expected the resultant polyimide to inherently feature the same dielectric constant, because the references obviously satisfy all of the chemical and structural limitations of the instant invention-see MPEP 2112.01.

As to claims 2-4, 6, and 13-14, both references are silent on properties of dielectric loss/constant, ratio of dielectric constant, density. However, one ordinary skill in the art would have expected the resultant polyimide to feature the same properties, because 1) the combined teachings of the references obviously satisfy all of the chemical and structural limitations of the instant invention-see MPEP 2112.01 and 2) the stretching and planar orientation as taught by Asakura effects the said properties that are being claimed, as cited by Asakura.

As to claims 11 and 17, Dalman discloses PWB having a layer of polyimide containing benzoxazole moiety (Abs.).

7. Claims 1-4, 6, 11, 13-14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris et al. (US 5741585) listed on IDS in view of Asakura et al. (US3966686).

Harris et al. discloses a polyimide film obtained by reacting bisoxazole containing diamine with dianhydride (Ex. 1, 3, Com Ex. A) followed by spin coating on silicon wafer and cured to polyimide having a thickness of 2.7-2.9 μm , falling within the range of thickness of application (1-150 μm [0089]).

Harris et al. is silent on planar orientation coefficient measured by X-ray diffraction as recited in claim 1.

Asakura et al. discloses films of aromatic polyamid-hydrzide, a polymer resembles polyimide (Abs). Said films are stretched to obtain planar orientation coefficient of more than 0.75 (note the similar determination method, 6:1-30, 5:5-15) that overlaps with the claimed range (0.79-0.89). It has been found that where claimed ranges overlap ranges disclosed by the prior art, a *prima facie* case of obviousness exists - see MPEP 2144.05. Asakura et al. further discloses the motivation of obtaining planar orientation to improve tensile strength, dielectric loss, curling etc. (1:15-20, 2:1-25).

Therefore, as to claim 1, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyimide film having benzoxazole

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moiety disclosed by Harris et al. and add step of obtaining planar orientation coefficient in view of Asakura et al. The motivation would have been to improve tensile strength, dielectric loss, curling etc. in the resultant polyimide films. Consequently, one ordinary skill in the art would have expected the resultant polyimide to inherently feature the same dielectric constant, because the references obviously satisfy all of the chemical and structural limitations of the instant invention-see MPEP 2112.01.

As to claims 2-4, 6, and 13-14, both references are silent on properties of dielectric loss/constant, ratio of dielectric constant, density. However, one ordinary skill in the art would have expected the resultant polyimide to feature the same properties, because the references obviously satisfy all of the chemical and structural limitations of the instant invention-see MPEP 2112.01.

As to claims 11 and 17, Harris et al. discloses a polyimide film (base substrate) (Ex. 1, 3 Com Ex. A). Harris is silent on “for printed wiring assemblies”. However, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use results in a structural difference (or, in the case of process claims, manipulative difference) between the claimed invention and the prior art. If so, the recitation serves to limit the claim. **In re Otto**, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP 2111.02. In this particular case, it appears there is the base substrate in claim 19 is obvious over the one in the reference, and one of ordinary skill in the art would obviously recognize the polyimide base substrate disclosed by Harris et al. would be capable of being used for printed wiring assemblies.

8. Claims 7-9, 15-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris et al. (US 5741585) listed on IDS.

Harris et al. discloses a polyimide film obtained by reacting bisoxazole containing diamine with dianhydride (Ex. 1, 3, Com Ex. A) followed by spin coating on silicon wafer and cured to polyimide having a thickness of 2.7-2.9 μm , falling within the range of thickness of application (1-150 μm [0089]).

Harris et al. is silent on the properties of the difference between a surface planar orientation degree of substrate surface and air surface of the claimed polyimide films recited in claim 7 and surface planar orientation recited in claim 8.

The application discloses the process of controlling said difference and surface planar orientation by controlling the solvent residue of green film, polyamic acid (the precursor of polyimide), between 25-50% ([0088]). The application does not limit film cast method to spin coating ([0048]). The application discloses the substrate can be metal oxide ([0105]).

Harris et al. discloses controlling the polyimide precursor which contains a solvent residue of 10-35% (16:5-15). Although the application teaches the unexpected result obtained by controlling the solvent residue in polyimide precursor to be more than 25%, Harris et al. discloses a range that sufficiently overlaps. In light of this, it has been found that where claimed ranges overlap ranges disclosed by the prior art, a *prima facie* case of obviousness exists - see MPEP 2144.05.

Harris et al. teaches as method for controlling the solvent residue in polyimide precursor. As a result, one ordinary skill in the art would have expected the composition and process (and the resulting product) disclosed by Harris et al. to feature the same property of orientation and orientation difference as recited in claims 7-8, because Harris et al. obviously satisfy all of the structural, chemical, and process limitations of the instant invention-see MPEP 2112.01.

Consequently, one ordinary skill in the art would have expected the composition and process (and the resulting product) disclosed by Harris et al. to feature the same properties of curling degree and ratio of dielectric constant as recited in claims 9 and 15-16, because the reference obviously satisfies all of the structural, chemical, and process limitations that would result in the claimed properties..

As to claim 19, Harris et al. discloses a polyimide film (base substrate) (Ex. 1, 3 Com Ex. A). Harris et al. is silent on "for printed wiring assemblies". This claim is rejected for the same rationale as applied to claims 1 and 11 in above ¶ 7.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE FANG whose telephone number is (571)270-7378. The examiner can normally be reached on Mon.-Thurs. 8 a.m. to 6:30 p.m. EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sf

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1796